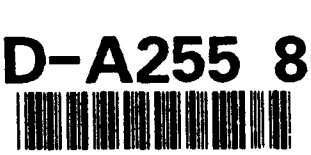
AD-A255 803



ITATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	20 May 1992	

1

4. TITLE AND SUBTITLE

AN OVERVIEW OF FACTORS INFLUENCING AWU WEIGHTS AND AMBULATORY WORKLOAD MEASUREMENT

5. FUNDING NUMBERS

MDA903-88-C-0147

6. AUTHOR(S)

Vector Research, Incorporated
Task Order Proponent: Stuart W. Baker, LTC, MS, USA

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

VECTOR RESEARCH, INCORPORATED
P.O. Box 1506
Ann Arbor, MI 48106

901 S. Highland Street
Arlington, VA 22204

8. PERFORMING ORGANIZATION REPORT NUMBER

VRI-DMIS-2.60 WN92-2

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

OASD/HS/HSO/RAMS
3 Skyline Place, Suite 1507
5201 Leesburg Pike
Falls Church, VA 22041-3203

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for Public Release: Distribution is Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

This document briefly summarizes various issues concerning the Ambulatory Work Unit (AWU) and AWU weights. The issues considered include:

- The precision and proper applications of AWU weights;
- The relationship of the AWU and the analogous Inpatient Work Unit (IWU); and
- The underlying incentives presented by these workload measurements.

14. SUBJECT TERMS

AWU Weights; Ambulatory Workload Measurement; IWU

15. NUMBER OF PAGES

18

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UL

VRI-DMIS-2.60 WN92-2
K. Dombkowski
J. Lee
20 May 1992

DRAFT
FOR REVIEW AND DISCUSSION
SUBJECT TO CHANGE

AN OVERVIEW OF FACTORS INFLUENCING AWU WEIGHTS AND AMBULATORY WORKLOAD MEASUREMENT

VECTOR RESEARCH, INCORPORATED

P.O. Box 1506
Ann Arbor, Michigan 48106
(313) 973-9210

901 S. Highland Street
Arlington, Virginia 22204
(703) 521-5300

FOREWORD

This document briefly summarizes various issues concerning the ambulatory work unit (AWU) and AWU weights. The issues considered include:

- the precision and proper applications of AWU weights;
- the relationship of the AWU and the analogous inpatient work unit (IWU); and
- the underlying incentives presented by these workload measurements.

This report was prepared under contract MDA93-88-C-0147. Questions or comments should be directed to LTC Stuart Baker, OASD(HA) Resource Analysis and Management Systems, (703) 756-1918.

CONTENTS

LIST OF EXHIBITS

1.0 FACTORS INFLUENCING AWU WEIGHTS AND AMBULATORY WORKLOAD MEASUREMENT

This document briefly summarizes various issues concerning the ambulatory work unit (AWU) and AWU weights. The issues considered include:

- the precision and proper applications of AWU weights;
- the relationship of the AWU and the analogous inpatient work unit (IWU); and
- the underlying incentives presented by these workload measurements.

Section 1.1 introduces the concept of the AWU weight and how AWUs are computed. Section 1.2 discusses the precision of the AWU weights and appropriate applications. Section 1.3 provides greater detail concerning the computation of the AWU and its relationship to IWUs. Lastly, section 1.4 discusses incentives and work measurement issues concerning the AWU weights.

1.1 COMPUTING AWU WEIGHTS AND AMBULATORY WORK UNITS

The AWU is a unit of measure of ambulatory medical workload that was originally designed such that the average financial resources required to complete one AWU of workload is equivalent to the financial resources required to complete one IWU of workload. The work units are additive to form the medical work unit (MWU). The purpose of the AWU and IWU is to provide a more precise method of comparing workload across facilities, as well as an improved method of determining financial resource requirements for military medical treatment facilities (MTFs). Unlike total visits, dispositions, and bed days, the AWU and IWU are case complexity adjusted workload measures that provide improved precision.

AWUs are computed using relative weights based on previous years' ambulatory cost and visit data. A relative weight is developed for each

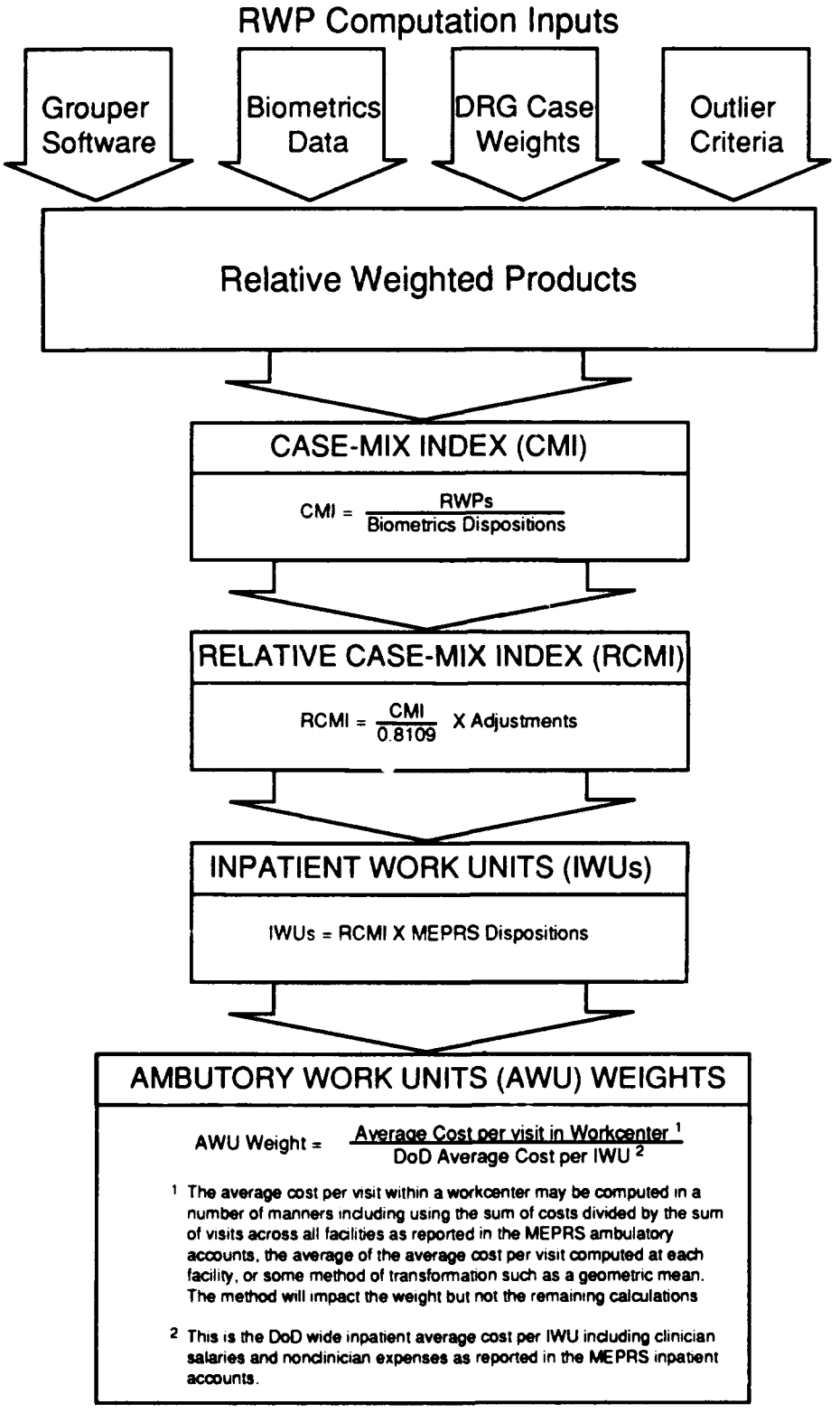
of approximately 60 Medical Expense and Performance Reporting System outpatient (MEPRS) three-character level subaccounts (also commonly referred to as workcenters or clinical areas). Thus, the costs include stepped down support and ancillary expenses along with direct expenses. The method used is analogous to that used for computing the roughly 500 diagnosis related group (DRG) weights for inpatient dispositions.

A weight is computed for each workcenter using the observed average cost per visit during some base year. The average cost per visit within each workcenter is then divided by a constant, the DoD-wide average inpatient (clinician and nonclinician) cost per IWU, to develop relative weights. The result is, that on average, the expected cost per AWU is equivalent to the expected cost per IWU. For example, a workcenter with an AWU weight of 0.0200 would require 50 visits to generate one AWU of workload. Thus, the average resource requirements for a visit to this workcenter is 1/50th of the average resource requirements for completing one IWU of work.

Exhibit 1-1 presents the inputs relevant to computing the AWU weights. Given the relationship between the DoD average cost per IWU and the AWU weights, there exists a direct relationship between the AWU weights and the method used to compute inpatient relative weighted products (RWPs) and case-mix indices (CMIs) for hospitals. That is, changes in the grouper software, DRG case weights, and outlier criteria impact the AWU weights. This relationship is discussed in greater detail in section 1.3.

Weights are developed for each workcenter and combined with visit data provided at the workcenter level to compute AWUs. The number of visits within each workcenter is multiplied by the AWU weight for each workcenter to obtain AWUs. Thus, if a facility had 10,000 visits within workcenter BAA, and the weight is 0.0200, the facility would be assigned

EXHIBIT 1-1: COMPUTING AN AWU WEIGHT



200 AWUs for visits to that workcenter. This is done for all workcenters and then may be summed over facilities, Service branch, or demographic categories.

Previous analyses have shown that the AWU is an improved measure of workload compared to total ambulatory visits. Visits within workcenter BAA - Internal Medicine in FY90 were on average 525% more resource intensive than visits to the BAB - Allergy workcenter. Using total visits as a measure of resource requirements, a facility that provided 1,000 internal medicine visits would appear much less efficient in terms of cost per visit than a facility that provided 1,000 allergy visits. Thus, the AWU weights and AWUs provide a means for adjusting visits such that the facility that served 1,000 internal medicine visits would be assigned roughly 525% more AWUs than a facility that served 1,000 allergy visits.

Unfortunately, MEPRS workcenters, and the visits recorded within them are often very broadly defined. Although the AWU is a definite improvement over total visits as a workload measure, as a measure of productivity and for more detailed analyses, it has limitations. These limitations are directly linked to the levels of precision at which the AWU is able to address workload credit. The following section provides a discussion of this issue and illustration through an example.

1.2 PRECISION AND APPLICATION OF THE AWU WEIGHTS

As observed above, the AWU weights, like DRG weights, are a measure of the average total resource requirements. Recall that DRG weights are based upon approximately 500 DRGs which have been defined based upon diagnoses, procedures, comorbidities, and complications. In contrast, the AWU weights are developed based on the average cost per visit within one of approximately 60 medical clinical areas. Thus, the AWU weights cannot be expected to appropriately credit each specific type of visit

within a workcenter, or differentiate between labor, capital, or supply requirements. The average cost per visit is obtained using cost data from between 2 and 200 facilities, depending on the workcenter. Since potentially numerous different types of procedures may be associated with a single workcenter visit, the AWU clearly lacks precision for completing facility level detailed analyses given its aggregate level definition.

Consider the example presented in part A of exhibit 1-2. In workcenter XXX, summed over all facilities, the average cost per visit is $52.00. If workload within the hypothetical workcenter were examined more closely, one might observe that there exist three types of visits within the workcenter. Additionally, some smaller facilities, such as free-standing clinics, may not provide comprehensive exams, or a retiree referred to a medical center for a comprehensive exam may require very resource intensive care relative to an active duty person at a small CONUS community hospital. Both episodes of care, however, may be recorded as a single visit.

If a facility provides these three services within its workcenter XXX, in the same proportion presented, with similar average costs for all types of visits, then the AWU weight will be accurate in measuring the workload for that facility within that clinical area. The weight, however, will not well represent the resource intensity required for either a telephone consultation or comprehensive exam. Only the average resource intensity for all types of visits.

Part B of exhibit 1-2 provides an example of the results when a same day surgery procedure is moved from the inpatient setting to the ambulatory setting. Suppose part A represents the visit mix prior to shifting the procedure, while part B represents the visit mix after shifting the procedure. The example assumes the average cost per IWU increases slightly as the same day surgery procedure moves from the

EXHIBIT 1-2: EXAMPLE COST PRECISION AND INCENTIVE PROBLEM

Assume the average cost per IWU is $2000.

PART A

Type of Visit	Number of Visits	Total Costs	Avg. Cost
Telephone Consultation	100,000	1,000,000	$10.00
General Exam	200,000	10,000,000	$50.00
Comprehensive Exam	200,000	15,000,000	$75.00
Total (Data Submitted)	500,000	26,000,000	$52.00

Average cost per visit = $52.00 AWU weight = 0.0260

PART B

Average cost per IWU increases to $2010 per IWU

Workcenter XXX after completing desired procedure in ambulatory setting:

Type of Visit	Number of Visits	Total Costs	Avg. Cost
Telephone Consultation	100,000	1,000,000	$10.00
General Exam	200,000	10,000,000	$50.00
Comprehensive Exam	200,000	15,000,000	$75.00
Same Day Surgery	10,000	20,000,000	$2000.00
Total (Data Submitted)	510,000	46,000,000	$90.20

Average cost per visit = $90.20 AWU weight = 0.0449

inpatient setting as it is anticipated that same day surgeries, assigned RWP credit, are assigned too much credit re ive to the required resources for completing the surgery. While the average cost per visit and AWU weight increased by over 70%, the new AWU weight will provide insufficient credit for the same day surgery while providing excessive credit for telephone consultations. Thus, facilities with same day surgery services may be under credited while facilities without these services will be over credited.

From the above discussion, the limitations of the AWU in terms of measuring productivity may be apparent. One can not expect the AWU weights to compensate accordingly for each type of visit when the weights are developed for exceptionally broad categories across facilities with varying care patterns, cost accounting practices, and medical services. Using the AWUs to measure, for example staff productivity, by comparing AWUs per full-time equivalent, across clinical areas, can only be used as a very rough estimate of productivity. The degree to which medical activities within a given workcenter for a given facility compares to medical activities for the DoD worldwide "average" facility and workcenter must be considered. Additionally, the AWU weights represent total financial resources, not just the labor component, and staff completing labor intensive procedures may receive substantially less AWU credit per FTE than staff completing capital or supply intensive procedures.

On average, after summing across all subaccounts for each facility, the AWU has been shown to be an accurate measure of total ambulatory resource requirements. This is especially true when adjustments are made for Service branch accounting methods and the type of treatment facility (medical center, CONUS community hospital, overseas hospital, and clinic). While there exist deficiencies with the AWU, this is the best measure available given information system constraints.

Additionally, the AWU serves its resource allocation purposes well when used at more aggregate levels.

1.3 RELATIONSHIP OF AWU WEIGHTS AND AWUs TO IWUs

Section 1.1 summarized the methodology for computing AWU weights and introduces the relationship between the AWU and IWU. To maintain the relationship between the AWU and IWU such that the expected average cost per IWU is equal to the expected average cost per AWU, each change in the method used to compute RWPs and CMIs should be reflected in the AWU weights. Preservation of this relationship is not necessarily required to effectively implement the resource allocation cost models, since there are distinct models for ambulatory and inpatient expenses. But loss of this relationship eliminates the value of the MWU, the sum of AWUs and IWUs, as a measure of workload. Under this scenario, one would require the components (AWUs and IWUs) to intelligibly compare workload across facilities or demographic categories.

There exist two components to updating AWU weights that will impact the comparability of AWUs over time as well as the comparability of AWUs and IWUs:

- changes in AWU weights relative to each other due to changes in the relative average cost per visit within each workcenter; and
- changes in all AWU weights relative to the cost per IWU due to general inpatient and ambulatory cost inflation, DRG grouper, case weight, and outlier criteria updates.

The latter component is an easier issue to resolve, since a DoD-wide global adjustment is made to preserve comparability of the IWU over time. If updating the grouper software and associated weights and outlier criteria causes an artificial change in workload, the RWPs and CMIs will be adjusted accordingly. For example, if updating from one grouper to the next causes a 5% increase in the DoD average CMI, CMIs at all facilities will be decreased by 5%. This global adjustment forces

there to be no change in the DoD average CMI simply due to a change in measure.

While a global adjustment may be sufficient for comparing total DoD IWUs over time, as data are examined at facility or demographic levels, the global adjustment will be insufficient. For example, if the 5% average increase in CMI were solely due to a 20% increase in weights for obstetrics procedures, and no change in all other weights, facilities with large obstetrics wards will receive substantially more credit while facilities without obstetrics wards will receive 5% less credit due to the global 5% adjustment. Additionally, at a demographic level, credit for males, patients over age 50, and patients less than 18 years of age will decrease by 5%, while credit for women aged 18-35 may increase by 10-15%. While admittedly an extreme example, changes in payment policies, and medical technology and practice, may cause substantial changes in some DRG weights. The same issues exist for ambulatory workload measures.

If a similar approach were used for AWU weights, total DoD AWUs can be adjusted such that no change is observed. But, the comparability of the IWU and AWU is then lost if the AWU weights are adjusted separately from the IWU. Additionally, similar to the IWU, observed changes in AWUs at a particular facility may not be due to changes in visit mix or volume, but simply due to changes in the AWU weights. Given the simplicity in computing AWUs, especially relative to grouping inpatient dispositions, one solution may be to simply have a set of AWU weights that serve as a "reference" set for time series analyses, while the other weights are updated annually. A more concrete example follows.

Looking at exhibit 1-3, assume the DRG weights and grouper version are updated to reflect new case weights and outlier criteria. Suppose in FY90 that total inpatient expenses are $1,500,000 and there are 1,000 IWUs of workload using the Version 4 grouper. Thus the average cost per

EXHIBIT 1-3: RELATIONSHIP OF AWU WEIGHTS AND IWUs

FY90

Total Inpatient Costs - $1,500,000
Version 4 IWUs - 1,000

Cost per IWU - $1500/IWU

Workcenter XXX

Ambulatory Costs - $150,000
Total Visits - 1,000

Cost per Visit - $150

AWU Weight --> $\frac{\$150/visit}{\$1500/IWU} = 0.1000$

AWU Credit

1,000 x 0.1000 = 100 AWUs

Cost per AWU

$150,000/100 AWUs = $1500/AWU

FY91

Total Inpatient Costs - $1,500,000
Version 4 IWUs - 1,000
Version 8 Unadj. IWUs - 1,050

RCMI Adjustment $\frac{1.050}{1.000} = 1.05$

Version 8 Adj. IWUs - 1,000
Cost per IWU - $1500

Workcenter XXX

Ambulatory Costs - $175,000
Total Visits - 1,000

Cost per Visit - $175

Weight Update

AWU Weight --> $\frac{\$175/visit}{\$1500/IWU} = 0.1167$

AWU Credit

1,000 x 0.1167 = 116.7 AWUs

Cost per AWU

$175,000/116.7 AWUs = $1500/AWU

No Weight Update

AWU Credit

1,000 x 0.1000 = 100.0 AWUs

Cost per AWU

$175,000/100.0 AWUs = $1750/AWU

IWU is $1500. Assume there is only one ambulatory workcenter, XXX, which has an average cost per visit of $150, therefore a weight of 0.1000 ($150/$1500), and AWU credit of 100 AWUs.

In FY91, assuming no inpatient cost inflation, and precisely the same types of dispositions, suppose the grouper update causes a 5% "artificial" increase in computed workload. The result of this update is the DoD total RWPs for a given year increase by 5% and the CMI increases by 5%. A global adjustment, however, is done such that there is no increase in the IWU. Thus, after CMI adjustment the global average cost per IWU remains at $1500.

Furthermore, assume the average cost per visit in workcenter XXX increased from $150 to $175 per visit. Even given the above adjustment for changes in CMI, the AWU weights still require updating in order to preserve the comparability of the IWU and AWU. If the weight were updated as shown, then the comparability of the IWU and AWU is preserved. Note that this update causes a credit increase of 16.7 AWUs even though there was no change in visits. Thus, the change in AWU credit directly reflects the increase in costs (resource intensity), cost per AWU is constant, and the resource intensity of the AWU and IWU remain comparable. If the weight were not updated, however, the AWU credit remains constant, the average cost per AWU increases to $1750 per AWU, and the average resource requirements for the AWU are no longer equal to the average resource requirements for the IWU.

Thus, there exists a tradeoff between maintaining the comparability of AWUs over time and the additivity of AWUs and IWUs. Given that currently separate resource allocation models exist for inpatient and ambulatory expenses, and the relative ease of computing AWUs, the importance of maintaining the additivity of the AWU and IWU may be minor. As the next section will describe, potential changes in the workload reporting incentives may make it desirable to update the AWU

weights frequently and allow adjustments to exist free from adjustments in the CMI and IWU computation methodologies.

1.4 AMBULATORY WORKLOAD INCENTIVES AND MEASUREMENT

The incentives created by the proposed resource allocation methodology are dependent upon many factors in addition to the measures used to compute workload. To control total expenditures, one may control unit costs through improved efficiency or using alternative care providers where appropriate. Alternatively, total expenditures may be reduced by reducing unnecessary workload through utilization management programs. At the facility level, the incentives for cost and utilization management are not clearly defined. A facility may be inclined to maximize total workload and therefore total reimbursement. A more realistic scenario may be where the facility maximizes the difference between reimbursements and actual incurred costs, much like a civilian hospital maximizes profit. The accuracy and precision of the workload measures, combined with policy decisions and quality monitoring and improvement programs, will influence how these incentives are perceived and the resulting medical care provision.

To illustrate this issue, consider exhibit 1-2 again. If facilities are allocated on average $2000 per AWU, and the typical visit to a workcenter generates 0.0260 AWUs credit per visit, then the facility will be reimbursed on average $52 per visit. In this example case, each telephone consultation will require $42.00 less resources than allocated, each general exam will require $2.00 less resources than allocated, and each comprehensive exam will require $23.00 more resources than allocated. How individual facilities will react under such incentives is unknown.

One problem, however, is in the lack of definition of a MEPRS visit. A comprehensive exam, for example, may include visits to more

than one clinic, but may have been traditionally recorded as a single visit. A follow up brief phone consultation may have not been recorded as a visit in the past, but with the proposed methodology, facilities may be inclined to record each of these activities as visits even though there is no change in resource requirements. Thus, while costs will not increase, the visit volume and apparent workload may increase substantially.

The degree to which the MEPRS subaccounts reflect actual operations within a facility will also impact reporting incentives. For example, the FY90 based weight for workcenter BDA-Pediatric Care is 0.0188. The weight for workcenter BDC-Well Baby Care is 0.0137. Thus, a facility that reports healthy newborn infant visits in a pediatric clinic will be allocated over 35% more funds per visit than a facility that reports newborn infant visits in a well baby clinic. There exists potential for substantial changes in visits to different workcenters, including the elimination of clinics in an accounting sense only, if these clinics are not well defined.

Within the inpatient setting, diagnoses and procedures, along with other detailed information available on the inpatient records, will allow for some adjustments. The lack of detailed ambulatory data, and imprecise definitions of visits and clinical areas, does not allow for complete and readily employed adjustments. Close monitoring of workload growth relative to reported expenses may be required to ensure appropriate allocations occur within the ambulatory setting.

One method to compensate for increased visit volume with little or no increase in resource requirements is to update the AWU weights frequently. Unfortunately, the previously discussed lack of precision within the AWU weights, and the fact that individual facilities may react in very different manners, may limit the impact of such updates.

One final note concerns the development of appropriate workload measures for same day surgeries. The current ambulatory workload measures do not provide sufficient precision to provide appropriate credit to same day surgeries if reported through MEPRS ambulatory subaccounts. This point is discussed in section 1.2. Additionally, the development of a separate ambulatory subaccount to record these surgeries most likely will not be sufficient as the variation in resource requirement for all same day surgeries may be too broad.

A potential solution that may be within the constraints of current MHSS information systems is to record all same day surgeries within the inpatient information systems. These records should be flagged accordingly, e.g., by clinical area, and using the provided diagnosis and procedure information appropriate credit may be assigned. Rather than using the DRG case weights and assigning credit based on average inpatient disposition costs, more appropriate weights can be developed.

In summary, the AWU provides a relatively accurate basis for measuring facility ambulatory resource requirements. Limitations in the precision of the AWU, due to the limited availability of detailed cost and workload information comparable across all facilities, restrict the appropriate uses of the AWU to aggregate level analyses. Additionally, this limited precision in workload measurement may require close monitoring of workload growth relative to reported expenses to prepare appropriate future resource allocations.